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Volume XIII JANUARY 1952 Number 1

DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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VOL. XIII JANUARY 1952 No. 1

Published monthly by
PHYSICIANS POSTGRADUATE PRESS
277 Broadway, New York 7, New York

EDITORIAL OFFICES
UNIVERSITY OF TEXAS SCHOOL OF MEDICINE
800 Avenue B., Galveston, Texas

Entered as second-class matter at the Post Office at New York, N. Y.

DISEASES of the NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

The Neuropsychiatrist In A Medium Sized Community

SIMON STONE, M.D.
Manchester, N. H.

The emergence of neuropsychiatry as a distinct specialty is of fairly recent origin. The neurologists in private practice, in the first three decades of this century were, however, with few exceptions, really neuropsychiatrists who combined the diagnosis of neurological problems with the treatment of noncommitable psychiatric disorders into a source of livelihood. The apellation of psychiatrist or alienist was nevertheless definitely avoided by them for fear that their more sensitive patients with emotional difficulties would refuse to consult them because of the implication that they were suffering from mental illness. The few psychiatrists or alienists in private practice were confined to large cities and frequently depended on teaching and institutional connections for an extra source of income.

Wider recognition of the importance of psychiatry came during the first world war as a result of the large number of psychiatric casualties and the important task accomplished by the neurologists and psychiatrists in the service in successfully handling these cases. The bringing together of a group of younger physicians interested in the diverse problems encountered had a pronounced influence on the future course of neurology and psychiatry in the United States. The institutional psychiatrist was given an opportunity to learn first hand about traumatic neurology, degenerative disorders and the effects of infections on the nervous system. Many neurologists with no institutional experience in psychiatry benefited from contact with psychotic and psychoneurotic problems in the service and had their ingenuity taxed in working out new methods of treatment. The experiences in the service also have proven that a young physician with the proper background and genuine interest could be adequately trained to grasp the intricacies of the practice of both neurology and psychiatry.

The concept of neuropsychiatry as a merger of both specialties was thus given recognition and it gained further momentum from the experiences in the second world war. Added respectability was contributed by its endorsement by the medical department of the Veterans Administration as a single specialty. Dissatisfaction with the term has been voiced by the few "pure" neurologists whose psychiatric practice is not infrequently limited to the pushing of a button of an electroshock machine when the patient's fees are commensurate with their estimate of their own abilities. These men consider organic neurology so complicated that they do not feel the majority of neuropsychiatrists are adept at dealing with neurological problems adequately—while they also remain interested in psychiatry. A similar attitude has also been prevalent amongst some psychiatrists, especially those with limited interest in organic disorders. It is obvious, however, that while a physician in a large city may devote his full time to the

From the Neuropsychiatric Service, Elliot Hospital, Manchester, N. H.

Read in the Section on Private Practice at the 107th annual meeting of The American Psychiatric Association, Cincinnati, Ohio, May 7-11, 1951.

practice of neurology alone, or to the general practice of psychiatry, or even limit his psychiatric practice to psychoanalysis, child psychiatry, industrial or legal psychiatry with adequate financial return, such a circumscribed practice would be neither profitable nor of substantial medical value in a smaller community. These facts I have found repeatedly confirmed in twelve years of private psychiatric practice.

After seven years of neuropsychiatric hospital experience it was with some reluctance that I decided on entering the private practice of neuropsychiatry in Manchester. The objection to going into private practice stemmed from my disinclination to give up several long range research projects on insulin therapy and the treatment of neurosyphilis that I was carrying on at the New Hampshire State Hospital. The pressure of routine hospital activities, however, made it difficult to devote adequate time to these studies, but the awareness that the first two or three lean years in practice would give me ample time for continuation with some of the work outside, helped to compensate for this relinquishing of some of the research activity. Previous close contacts with several physicians in the town has also made my entrance into private practice less of an ordeal. It was pointed out to me, however, that two other physicians have within recent years attempted to develop a private practice in psychiatry but failed. One of the men, however, limited his therapeutic approach to psychoanalysis mainly and the other to general psychiatry but no neurology.

Manchester is the largest and most industrialized city in New Hampshire, with a polyglot population of about 80,000. This includes three large segments of French Canadians, old Yankee stock, and of Irish descent, and more recent newcomers of Germanic, Greek, Slavic and other origins. The average family income is somewhat lower than for many other cities of comparative size and ranges from $35.00 to $60.00 per week. It is also correspondingly smaller in rural areas. Three general hospitals, each catering to a different population group, supply ample coverage for general medical needs. No separate provisions are available, however, for the care of psychiatric patients and no disturbed patients are accepted except on rare occasions with special nursing protection. The relationship between the medical staff members of the various hospitals has always been very cordial and a member of one hospital staff is accorded full courtesy privileges in the other hospitals. Outside of two nursing homes that accept moderately overactive patients with proper nursing supervision there are no other facilities available.

Referred cases represented about 90 percent of the patients seen during the first three to four years of practice. An analysis of cases seen recently showed that 28.5 percent came as direct contacts or have been recommended by other members of family or acquaintances, and the balance were referred by physicians, various social agencies, or insurance companies for neuropsychiatric evaluation. In one year cases were seen for 160 different physicians in private practice, which would indicate the acceptance of the neuropsychiatrist in this state as a valuable adjunct to community or state medical practice. Many of these referrals represented only a single examination and report. It has been understood, however, that in instances where more specialized follow up care was required, the neuropsychiatrist will accept the patient for treatment after forwarding a report to the attending physician with such recommendations. In many instances because of the long travel distances involved — anywhere up to 180 miles—it was found necessary to outline a treatment program for the local physician for him to carry out with additional visits or telephone consultations at convenient intervals.

An analysis of 200 consecutive cases seen at the office disclosed that 61 percent were psychiatric cases, 36 percent were classified as neurological or were referred for neurological evaluation and 3 percent were not found to be of neuropsychiatric origin. Sirkin[1] in private practice in rural New York, found 10 percent of his cases to be neurological in the first year of practice. Rickles, Klein and Bassan[2] in Seattle, gave 7 percent as the incidence of their neurological cases. Garrard[3] in Greensboro, North Carolina, a

town about the same size as Manchester, N. H., has commented that the private practice of neuropsychiatry usually reduces itself to the practice of psychiatry which is at variance with my own experience. The probable explanation for this is that some men in practice of neuropsychiatry have expressed little interest in neurological problems either as a result of inadequate preparation for neurological practice or because the field of neurology or neurosurgery is already adequately covered in their community.

A breakdown of 200 consecutive psychiatric cases seen showed that anxiety states supplied about 35 percent of cases seen, conversion reaction 7 percent, obsessive anxiety states 5 percent, or a total of 47 percent were diagnosed as psychoneurotic. Manic depressive, depressives represented 11 percent, involutional depressions 8 percent, involutional paranoid and paranoid conditions 6 percent, post traumatic neuroses 5 percent, schizoid personality disorders 4 percent, alcoholism 4 percent, impotence 3 percent, schizophrenias 2 percent. The balance included cases of homosexuality, exhibitionism, mental deficiency, stuttering, transvestism and primary behavior disorders.

In the neurological group of cases head injuries and their sequelae comprised the largest group or 28 percent, cerebrovascular accidents 17 percent, poliomyelitis 5 percent, Parkinsonism 4 percent, convulsive disorders 6 percent, various neuropathies 4 percent, multiple sclerosis 3 percent, and the balance cases of labyrinthitis, Bell's Palsy, lateral sclerosis, combined system disease, narcolepsy and toxic encephalopathy. A number of these cases were seen only once and then returned to referring physician or agency with recommendations for further treatment.

The widespread notion in some communities that psychiatric diagnosis and treatment is beyond the reach of a person in moderate circumstances has evidently not found acceptance locally. About 80 percent of the families of my patients have an income of less than $50.00 weekly. Frequent visits to the psychiatrist's office if carried on for months would in most instances become a definite financial burden. For this reason several short cuts have been found useful.

Usually a complete history, neurological checkup, nutritional survey and psychiatric evaluation is carried out during the first visit and the patient's problem briefly discussed with the patient or family. A program is mapped out till the next visit, including correction of nutritional or endocrine deficiencies, if present, by prescription of vitamin or hormonal supplements, also the additional use of analeptics and mild sedatives if found desirable. I found nutritional inadequacy to be much more common than suspected, and an inquiry into a patient's breakfast habits is just as important as investigation of sexual practices of the previous night. A breakfast consisting of a slice of toast, cup of coffee and cigaret is altogether too common even in the group doing more than average physical labor. I usually find that return of zest for breakfast frequently parallels the improvement in patient's mood. I have also found 50—100 mg. of mixed tocopherols[4] with breakfast an analeptic agent more effective in the long run than the amphetamine group of drugs although the results are not as spectacular. Usually in the psychoneuroses the next visit is arranged at two to three week interval to give the patient an opportunity to digest some of the material previously discussed. Depressed patients are usually seen again within a week or ten days unless the depression is very severe and immediate hospitalization for electroshock is indicated. I have made use of pamphlets, books, movies, plays, when accessible, for therapeutic purposes. Knowledge of proper sexual technic can frequently best be imparted if the general office discussion is supplemented by a pamphlet or a book which can be perused at leisure by husband and wife. I have also found it advisable to distribute such pamphlets or book to many patients without cost as it has been my experience that many would not bother to buy any such book even if highly recommended. The patients' response has been very gratifying.

My approach to therapy is synthetic rather than analytic. After establishing rapport with the patients, ample time is given them to express their problems aided by

leading questions. In most instances many of the contributing factors can be unearthed without direct probing which, I believe, is frequently more harmful than beneficial. Knowing the patient's past history, physical state, emotional balance and positive and negative factors in present environment, a therapeutic plan is worked out for the future. This involves use of direct and indirect suggestion, free discussion of pertinent problems, interviews with other members of family, utilization of various positive factors available in the environment to achieve better adaptation, and also in developing better insulation against exogenous noci. My patients could not afford prolonged analysis either for financial reasons or because of limited intelligence, or religious scruples, and I do not see any advantage of exposing most patients to such a rigorous regime unless the results would, in my opinion, justify the expenditure of the psychiatrist's time and also the patient's finances of which I have considerable doubt. It is not my objective to train amateur psychoanalysts, and I would also consider it a serious neglect of my responsibility to the community if I had devoted years of my time to the care of a dozen patients with an expectancy of improvement of about 60 percent, when I can care for many times that number with at least as good a rate of adequate adjustment.

I use shock therapy in depressions, severe involutional melancholias, resistant cases of psychoneurosis but only after several visits and reevaluation of the need for shock therapy. Of course, in severe depressions where there is a definite risk of suicide, shock treatment is instituted earlier. The results with shock therapy have been very gratifying and, at times, I have felt that I have probably been too cautious in temporarily withholding the treatment. General hospital facilities are utilized for shock therapy.[5] I found that nearly all cases of depression or involutional melancholia can be hospitalized with safety in a general hospital, although in a few agitated and suicidal patients special nursing supervision was required for a few days after hospitalization. After a few electroshock treatments the special nurses could be usually dispensed with and patient placed in general care. A number of depressions have been admitted as ward patients and have gotten along well on the open ward. The average hospitalization time is ten days to two weeks. In a few instances, uncooperative and difficult to manage patients had to be placed in a nursing home and brought to the hospital for electroshock therapy as their presence in the hospital has proven too disturbing to other patients. The advantage of hospitalization in a general hospital is that the Blue Cross and many private insurance companies will reimburse for such hospitalization which they do not when a patient is cared for in a nursing home or in the state hospital. In a few instances commitment in a state hospital became necessary because of failure to obtain patients' voluntary cooperation for the shock treatments. The utilization of general hospital facilities has had a beneficial influence on patient's morale and also helped demonstrate to the medical and nursing staff of the hospital that psychiatric patients are no more of a nursing problem than general medical cases and the response to therapy is frequently dramatic and spectacular.

Commitments in the past have represented a considerable source of additional income to some psychiatrists. However, as a result of my connection with the State Hospital, I am legally not permitted to sign commitment papers. The physicians in Manchester are aware of the fact and, therefore, I rarely am asked to see noisy, unmanageable patients where the problem is mainly of disposition. I am occasionally called, however, for telephone advice on such cases or asked to examine the patient to determine the need for commitment. Such an arrangement does not displease me. In a small community it becomes known after a while that a visit from a certain physician means a trip to the State Hospital and does interfere to some extent with the establishment of early rapport with other office patients. Psychotic patients who would resent hospitalization at the State Hospital have voluntarily entered the Elliot Hospital for electroshock therapy when their need for treatment was frankly discussed with them. In view of the brief hospitalization required in many cases and the aid given by hospitalization services, many a family has found it easier financially

to have the patient receive treatment at a general hospital than at the State Hospital. The Elliot Hospital also accepts extramural patients for electroshock therapy which I usually limit to residents of Manchester and immediate vicinity. I do no office electroshock therapy.

A general hospital staff appointment in neuropsychiatry is indispensable and mutually beneficial. It brings the neuropsychiatrist in close contact with other staff members, attendance at staff meetings and conferences helps maintain his interest in general medical problems, and it also gives an opportunity for other staff members to discuss problems with him. Annually a number of patients are admitted to a general hospital with obvious neuropsychiatric problems which are not referred to the neuropsychiatrist because the physician in charge of such cases is frequently unaware that more specialized care would benefit the patient. The attending physicians are usually more than willing to turn such "headaches" over to the neurophychiatrist if the latter shows an interest and is capable of handling such problems adequately.

Of course, considerable ground work may have to be done before the neuropsychiatrist's niche in the hospital scheme is established. Some orthopedic surgeons may require convincing that a recurrent persistent backache may be another expression of a manic depressive, depressive state, or that a spasmodic torticollis is on the basis of a conversion reaction; also that not all cases of sciatica are due to back strain or a protruded intervertebral disc, but that some may be caused by cord tumor or multiple sclerosis. In several instances patients failed to recover after indicated abdominal or urological surgery because of an underlying depression, but responded well to four to six electroshock treatment much to the surgeon's relief. The general surgeon after such cases are demonstrated to him will more likely refer similar cases for neuropsychiatric evaluation, and also patients who seem to be anxious to undergo surgery without any surgical indication for such procedure.

The urologists have frequently referred cases of impotence for psychiatric evaluation after a negative urological survey and also bladder disturbances of neurogenic origin. The ophthalmologist has often been the first to recognize the presence of papilledema in brain tumors, or a retrobulbar neuritis or other visual disturbances as early symptoms of multiple sclerosis and referred such cases for neurological evaluation. Cases of primary behavior disturbances in children, muscle dystrophies and atrophies are frequently seen, occasionally after the pediatrician had recognized the condition first. Postpartum psychotic episodes and cases of persistent vomiting of pregnancy have been referred for evaluation by the obstetrician, as well as cases of mongolism recognized early, and birth injuries.

When I first started to practice, I would devote at least two to three mornings a week to free state clinics—one in mental hygiene and the others to a local and traveling clinic for crippled children conducted by the State Crippled Children Services. While most of the patients seen in the mental hygiene clinic represented primarily a problem in behavior and adjustment, the crippled children clinics really constituted neuro-orthopedic clinics where every variety of neuropsychiatric or neuromuscular disturbance of childhood and adolescence were eventually seen. The close contact with the five orthopedic consultants to the clinics and a pediatrician made these clinics both instructive and useful. Due to time limitation at present I attend only two crippled children clinics a month and one clinic in convulsive disorders once monthly. The neuropsychiatrist is also called occasionally in consultation by the staff of other hospital clinics including cancer, general medicine, and adult orthopedics. Two recent epidemics of poliomyelitis in 1946 and 1949 have demonstrated the effectiveness of hospital team work in that every patient with poliomyelitis admitted to the hospital services was examined and followed by the orthopedic surgeon and the neuropsychiatrist, the latter also acting as coordinator between the various services.

Any investigative work must of necessity be long range and clinical in character. My own interest in nutrition led to investigation of intraspinal vitamin therapy,[6] the therapeutic value of vitamin E in neurological[7] and psychiatric disorders,[4] and also electro-

shock therapy.[5] Free clinic facilities and the state hospital were utilized to good effect in these studies. One must remember, however, that the primary responsibility in private practice is to the patient for whom the physician is caring at the time. The inquiring physician nevertheless will find enough unexplored territory to occupy his interest and also an opportunity to make valuable contribution in clinical research, for even if he lacks expensive facilities for special laboratory studies he is closer to the patient and has better opportunities for long range observations and evaluation of new therapeutic methods.

My court appearances are infrequent and deal mainly with my duties as examiner of suspected sexual psychopaths. Most of the posttraumatic cases that I examine from a medicolegal angle are usually settled out of court after an impartial opinion is rendered following a thorough examination. Such an unbiased report makes it easier for the patient's attorney and the insurance company to come to terms thus avoiding expensive litigation.

Veterans supply a tiny fraction of my practice, partly because of the presence of an active traveling psychiatric clinic conducted by the Veterans Administration in the state and partly because of my disagreement in some cases with the policy of the Bureau on service connected neuropsychiatric disabilities. Occasionally a veteran whose pension has been cut will request an examination for the purpose of having such pension restored. In nearly all instances I found that the Veteran's Administration Rating Board had been generous. This usually results in my not being paid for the examination, although in a number of instances the veteran seemed to appreciate the free discussion of his case and the honest reason for disagreeing with him in his demands.

At present I do very little public speaking before lay groups. I found from past experience that while there is some increase in psychiatric problems as a result of the popularization of the subject in the lay press and through the medium of movies and radio, the psychiatrist is primarily invited by the committee on programs to entertain the group for an evening and oftentimes as an after-thought after an unexpected change in plans of the scheduled speaker. The psychiatrist has to be cautious in gauging the temper of his audience so as not to arouse any unnecessary anxiety in some of his listeners. My own impression is that psychiatry has oversold itself already on psychiatric subjects before lay audiences by giving undue publicity to various problems that might come within the psychiatrist's domain without having enough trained psychiatrists around to cover this artificially produced increase in demand for psychiatric attention. As a result many unqualified psychologists, osteopaths or chiropractors have taken over the care of this large group of cases in the medical no man's land.

Oberndorff[6] expressed the generally accepted impression that a city of 30,000 population could amply support a full time psychiatrist. This, of course, will depend on the proximity of the city to other large communities or to medical centers, the financial standing of the population and the referring index of the physicians in that community. It is my impression that any city of 30,000 will amply support a neuropsychiatrist. A physician limiting his practice to psychiatry alone may find the going heavy at first unless he has other special sources of income such as institutional or veterans administration part time job, or his practice is weighted with electroshock treatment cases. Such a practice will boomerang after a time when the large number of cases not relieved by shock therapy come home to roost.

What are the requirements for a successful neurophychiatric practice in a smaller community? An adequate background of didactic and clinical training in psychiatry and neurology so as to enable him to accurately diagnose and give proper treatment to the majority of cases referred to him. Ability to carry out and evaluate various neurologic diagnostic procedures such as spinal fluid studies, pneumoencephalography and myelography; more than a passing acquaintanceship with neuroentgenology and electroencephalography. Knowledge of various psychological tests and what additional aid they can offer in diagnosis. I found little need for the various interpretative psycho-

logical tests in my own practice, although they are useful in medico-legal cases for they offer more concrete visual confirmatory evidence. Prompt reporting to referring physician of important findings with suggestions as to carrying on with the case if the referring physician is interested and capable of caring for the patient's neuropsychiatric problem with the facilities at his disposal. An awareness of one's own limitations and willingness to refer any patients for neurosurgical attention or further hospitalization if such facilities are not available locally. A holistic approach in therapy utilizing every facility at one's disposal for the benefit of patient and avoiding the limitations of a single therapeutic approach, be it psychoanalysis, insulin, electroshock or histamine therapy or group reeducation. Such a practice requires greater self-reliance, ability to improvise, utilization of local resources, for one cannot call on the hospital chief continually for assistance. The reward of such a practice lies in the awareness that in a smaller community the neuropsychiatrist is an important cog in the medical wheel, that he is making a real contribution to the community's health, that he is not competing with anybody and that many of the problems that he is dealing with would remain unattended or improperly managed due to the unawareness of newer approaches in therapy by the average physician. Education of the physician as to what can be done for the neuropsychiatric patient, especially in view of the nihilistic attitude implied in many medical school lectures in neurology and psychiatry, is a gratifying task. The average physician, however, is not interested in a windy discussion of all and sundry theories of psychopathology or in having the patient's ailments presented to him in terms of body orifices with their scatological overtones. Unless this terminology is completely and thoroughly explained to him, which is usually impossible either because of time limitation or disinterestedness, it is better to avoid any use of complex terminology, for such reports will be used by some men only for purposes of demonstration to their colleagues that the psychiatrists occasionally exceed their patients in wackiness of language. What he expects is a concise report, which should contain an adequate diagnosis, prognosis and specific recommendation for treatment and a brief but an intelligible discussion as to etiology and prevention of recurrences.

Is neuropsychiatry a doomed specialty? From reports emanating from neurological quarters[9] it would appear that scrapping of the term of neuropsychiatry would be of benefit to both neurology and psychiatry. The results from the recent American Board examination in Neurology and Psychiatry, would tend to confirm this trend. In the December 1950 examination only 3 individuals were successful in passing neurology and psychiatry and only 17 were passed in neurology—about 10% the total number examined. This indicates either a faulty method of preparation in neurology for which the responsibility lies with our clinics and hospitals and the dean's committees of our various medical schools responsible for postgraduate training in neuropsychiatry, or a deliberate attempt on the part of a small group to limit the practice of neurology to a small consulting or teaching group connected with large medical centers with a total disregard of the needs of the country at large. Such a near-sighted attitude is to be deplored. The neurological disorders that are cared for in smaller communities by the neuropsychiatrist, and no community less than a 100,000 in population can support a "pure" neurologist unless he has the physicians well educated in the community and he also treats psychiatric patients in higher income brackets, will as a result remain either poorly attended or drift into the hands of the osteopath, chiropractor or other manipulators for lack of local specialized diagnostic aid and treatment facilities.

If it is the aim of the American Board of Neurology and Psychiatry to have the care of neurological patients outside of the big cities taken over by the neurologically oriented internists or neurosurgeons, there are not enough of them available even in large cities and few of them will venture out in smaller communities. With the very small number of men being certified in neurology at present, one can remain certain that very few of them will move away from large medical centers with their prospects of impor-

tant teaching and hospital connections and lure of big city practice which such certification is expected to attract. Such a near-sighted viewpoint reflects the nihilistic attitude toward neurology of the first quarter of this century when teaching of neurology was limited to neuroanatomy and neuropathology with therapy given very little consideration. The patient was nearly always correctly diagnosed but then forgotten till autopsy. However, the advances achieved with the use of antibiotics in infections of the nervous system, the use of newer anticonvulsants, also prostigmin, artane and dramamine, the antihistamintic drugs, oral, parenteral and intraspinal vitamin therapy has made neurology a dynamic specialty, with the need for more physicians specially trained to disseminate such information which the present board seems to have failed to appreciate. Their aim would appear to be to qualify men for teaching positions in neurology and for membership in the American Neurological Association, but not for practice outside of big cities and to take care of the vast number of patients requiring specialized neurological attention.

Nearly twenty years ago "Archives of Neurology and Psychiatry" published a series of papers on the training of the neurologist and psychiatrist. Dr. J. Ramsay Hunt[10] who described himself as a neuropsychiatrist gave a lucid and well thought out outline as to the requirements for training in neuropsychiatry. His conclusions were summarized in an editorial on the "Training of the Neurologist and Psychiatrist."[11] The following is an excerpt of that editorial which should be given consideration by anyone interested in the country's needs for qualified men in neurology and psychiatry.

"The training of the neurologist and the psychiatrist is not a matter of this day alone. More important is the consideration of the future. Only in large cities is narrow specialization possible. Neurology and psychiatry have too much of value to offer to restrict this usefulness to residents of metropolitan areas. The smaller cities, the towns and the country districts need, and should have, neurologic and psychiatric care. Many are the places that could not support both a neurologist and a psychiatrist, to say nothing of a psycho-analyst as well, yet which could support and would welcome a good physician trained in both disciplines. The members of the medical profession will not have fulfilled their duty to their fellow men until they have devoted their energies to the training of such physicians."

These conclusions are just as timely today as when they were originally published.

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Non-Sleep Electroencephalogram Activation

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Any method which will accentuate or elicit abnormal cerebral, electrical activity demonstrable in the EEG may be termed EEG activation. E. and F. Gibbs[1] have demonstrated that most patients display more seizure discharges in the EEG when asleep; that some conditions like psychomotor epilepsy can best be diagnosed by spike discharges from the anterior temporal areas.[2] Unfortunately this method is time-consuming and cumbersome, particularly for routine EEG's and out-patient care. The long recovery period of patients after they have once been put asleep by various barbiturates makes this method impractical for the small, busy laboratory.

We have, therefore, reverted to three other methods, which, of course, have been recommended previously by other workers, namely hyperventilation, metrazol activation and photic driving (intermittent photic stimulation). We have furthermore endeavored to compare these various activation methods with each other and to compare their relative effectiveness and merits.

Hyperventilation

Hyperventilation has been used successfully as an early activation technique. Engel and co-workers[3,4] could show a relationship between EEG changes and CO_2 removal during hyperventilation. Gibbs, Gibbs and Lennox, found that the proportion of patients displaying synchronous spike-dome discharges could be increased by 8 percent with hyperventilation compared to the resting record.

We found three minutes definitely the optimum time for hyperventilation activation in adults after evaluating 3000 records. A "build-up" of pattern after four minutes occurs in almost 20 percent of normal records and is diagnostically of little significance. Generally the alpha frequency output is increased during hyperventilation as previously noted by Cohn.[6] In our experience, hyperventilation "break-down" and "build-up," even paroxysmally, is common in children below the age of ten[7] and is diagnostically of little significance unless we obtain typical spike-dome formations persistent after hyperventilation. In addition, slow wave formations in the 6 to 7 p/sec band, particularly over the frontal regions are of no definite diagnostic significance in adults. (Cohn.[5]) It is our experience that hyperventilation records in general are useful to accentuate EEG abnormalities observed in the resting record.

We have tabulated in Figure I the hyperventilation response of 103 patients collected at random over a limited time period. It is interesting to note that only 7 percent of the group "without neurological disease" displayed a definite hyperventilation breakdown. We did not include in this group any subjects showing an abnormal resting record.

HYPERVENTILATION—EEG IN VARIOUS NEUROLOGICAL CONDITIONS

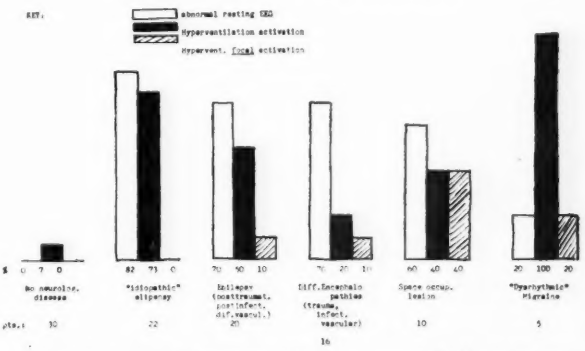

Fig. 1. EEG Response to hyperventilation in various neurological disorders.

The next group consisted of twenty-two epileptics who had attacks starting at least from puberty (classified as "idiopathic" epileptics). Eighty-two percent showed abnormal resting EEG's and 73 percent showed hyperventilation activation. None showed any focal hyperventilation accentuation. Children below the age of 10 were excluded from this group.

Presented at the 26th Annual Convention of the Central Neuropsychiatric Association, Cleveland, Ohio, October 14, 1950.

Considering the third group, "symptomatic" epilepsy, either on a vascular, posttraumatic or postinfectious basis, 70 percent showed an abnormal EEG but only 50 percent showed hyperventilation activation. Among them 10 percent showed focal activation. It seems therefore, that focal activation in an epileptic record may be rather indicative of symptomatic epilepsy and it seems furthermore that a non-response to hyperventilation may be indicative of a symptomatic origin of the malady rather than of an idiopathic one. May we add here that among a group of 50 patients receiving electric shock treatment and showing subsequent paroxysmal, dysrhythmic discharges in the EEG, as previously reported, less than 13 percent showed hyperventilation breakdown, a characteristic difference towards idiopathic epilepsy. (Weil and Brinegar.[8])

Within Group No. 4 we have summarized various forms of encephalopathies (vascular, posttraumatic or postinfectious) with definite neurological abnormalities, but without clinical epileptic attacks, we find only 20 percent *generalized* hyperventilation activation but 10 percent focal activation. This in spite of the fact that we noticed 70 percent abnormal resting EEG's.

The last group, space-occupying lesions, showed 60 percent abnormal EEG's, 40 percent of them showing generalized hyperventilation activation and 40 percent focal activation. It appears, therefore, that hyperventilation is not a very reliable method in any type of space occupying lesion.

Finally turning to a condition we labeled "dysrhythmic migraine," we noted that 20 percent of patients with migraine showed an abnormal resting EEG, but 100 percent of "dysrhythmic migraine" patients showed hyperventilation activation. This is obvious, since the diagnosis depends on a marked hyperventilation activation in the EEG. Only patients were included who showed clinically typical migrainous aura with flimmer scotoma, definite hemicrania and vomiting at the termination of an attack. We found these patients responding well to Dilantin supported by Gynergen. R. Cohn[6] also noticed in these groups of patients very satisfactory response to anticonvulsant medication as did Friedman and J. Cohn[9] in a very recent publication. Figure 2 demonstrates an EEG of a patient belonging to this group.

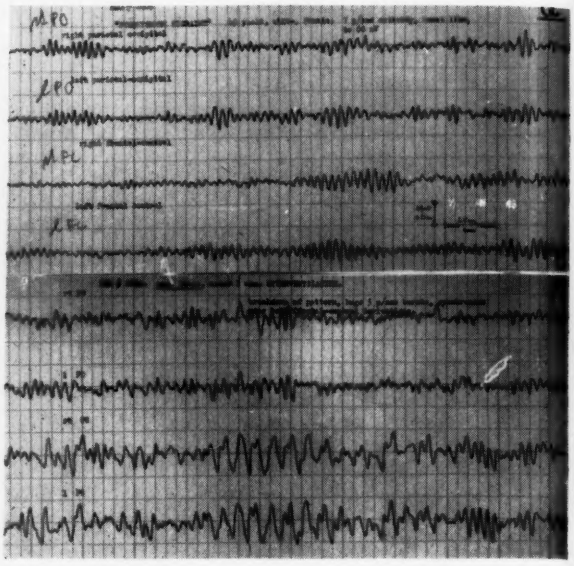

Fig. 2. a) EEG obtained from a 49 year old, white, female: "dysrhythmic migraine." Resting record shows 7 p/sec. activity of 60 mV.

b) Hyperventilation produced after one minute 3 p/sec. (120 mV) bursts, synchronous, over both frontal-central derivations.

Metrazol

There are reports to the effect (Cure et al.,[10] Kaufman et al.[11]) that Metrazol administration is a good electroencephalographic activation technique. Very early (1943) we tried to experiment with intramuscular injections but discontinued it since the absorption time could not be controlled and a seizure occasionally occurred after the patient had left the laboratory. In 1947 Kaufman, Marshall and Walker[11] reported that the rapid intravenous administration of 200 mg. of Metrazol clearly activated the epileptogenic focus in almost 70 percent of 106 patients with posttraumatic epilepsy. In 1948 Cure, Rasmussen and Jasper[10] recommended slow intravenous administration over a period of 5 to 20 minutes usually in doses of 40 to 50 mgs. per minute. We experimented with both rapid and slow intravenous injections. We noted that rapid injections frequently activate the whole cortex in an explosive fashion. This is of little significance from a localizing point of view. We found the most satisfactory procedure as follows: a slow intravenous injection of a 5 percent solution giving 1 cc. per 30 sec-

onds, the patient getting 50 mgs. per 30 seconds. We stop as soon as EEG activation occurs. We do not advise giving more than 300 mgs. since there may be danger of an epileptic neuronal explosion. Unfortunately even under these precautions epileptic seizures occasionally do occur. In view of our experimental grasping and groping with various methods of Metrazol administration, we have not compiled any definite Metrazol statistics.

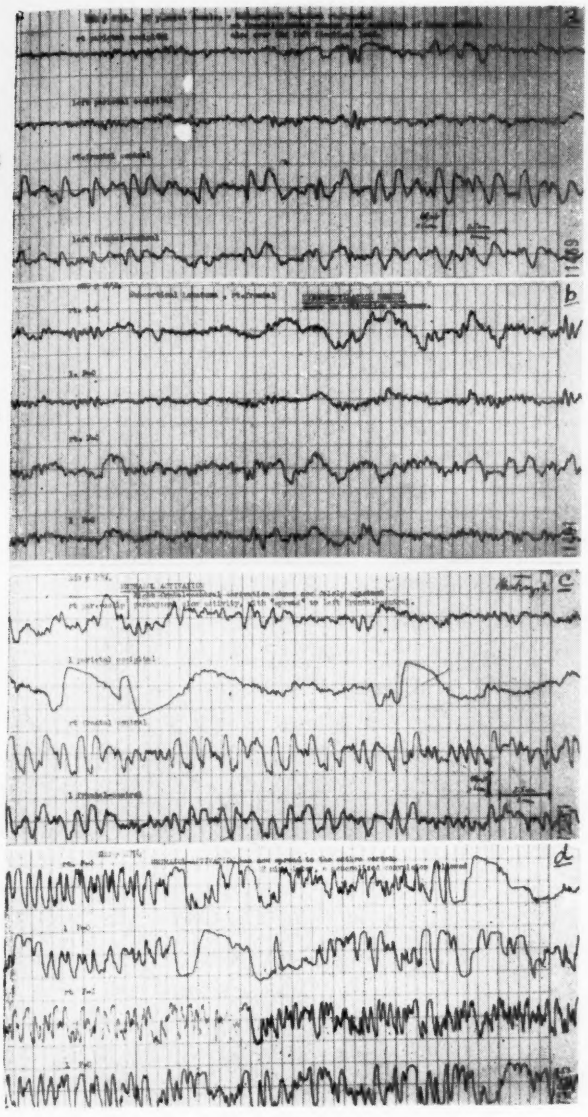

Fig. 3.

a) 27 year old female, subcortical hematoma, right fronta. Note right frontal-central slow activity with "spread" to left identical area.
b) Hyperventilation record shows *no* activation, record appearing even more "normal" than resting record.
c) Metrazol activation: Paroxysmal slow activity over right frontal-central derivation predominantly.
d) The slow activity has now spread over the entire cortex! Note that sharp waves and spikes are still somewhat more predominant over right frontal-central derivation.—2 minutes later, a generalized convulsion followed.

Figure 3 demonstrates the EEG of a 27 year old white female who was found later to have a subcortical hematoma of the right frontal area. Note that the resting record showed over the right frontal-central slow activity which was *not* accentuated by hyperventilation, the hyperventilation tracings appearin geven more normal than the resting record.

In Figure 3 c & d there is Metrazol activation of this patient, producing paroxysmal slow activity over the right frontal-central derivation predominantly; the post-injection record showed a spread of epileptiform bursts over the whole cortex finally followed by a clinical seizure.

We have found Metrazol activation useful in a group of patients having insufficient hyperventilation break-down particularly symptomatic epilepsy and localizing cortical lesions.

Photic Stimulation

Berger[12] noted in his early investigations that photic stimuli to the retina may change the spontaneous alpha rhythm. Intermittent photic stimulation ("photic driving") was introduced by Adrian and Matthews[13] who demonstrated partial control of spontaneous, cerebral frequencies by means of rhythmic, intermittent illumination of the retina. Most better-equipped laboratories utilize a stroboscope which, of course, also shows "photic driving," i.e., the occipital cortex may take on a frequency synchronous with the flicker or doubling the flicker frequency. The stroboscope, however, has frequently a "click" noise which produces unpleasant eye muscle artefacts.

An associate, E. Marsh, B.E.E. improvised an apparatus (Figure 4) utilizing a high intensity light source.

As none of the commercially available lights employing a hot filament could be made to extinguish rapidly enough for service at the desired flicker frequency, it was concluded that a mechanical light interrupter placed in front of a constant high

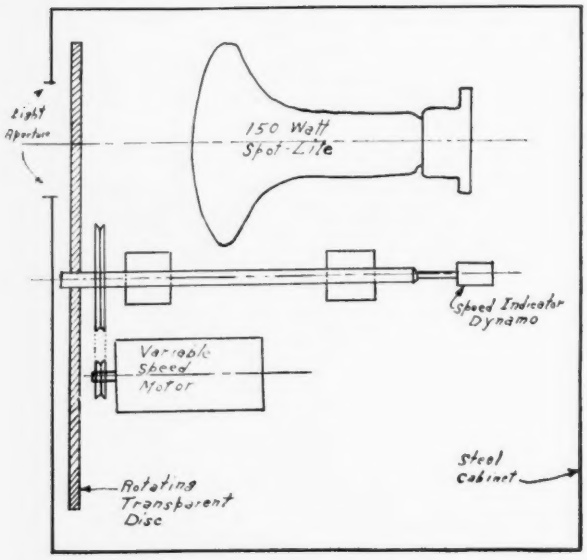

Fig. 4. Diagram of a controlled frequency light source for photic driving.

intensity light source would be more satisfactory.

The light source consisted of a 150 watt, self-contained indoor spot lamp, a circular disk of lucid plastic, half painted black, half transparent, rotating in front of it. The flicker potential is directly recorded on the EEG tape. Since there is in this method some danger of "burning" the macula we later used a new type photic stimulator utilizing a rapidly discharging gas-tube (now commercially manufactured). We observed definite differences in the EEG responses of subjects depending on whether the eyes were open or closed, and particularly depending on the light intensity. Clinically we occasionally noticed an interesting phenomenon demonstrated in Figure 5. This EEG was obtained from a white male who suffered a left parietal-occipital skull fracture. Photic driving produced a flicker response over the affected hemisphere but not over the healthy one. This was termed by us "hemispheric driving." It probably represents a lowered threshold of the affected hemisphere to maintain its innate pattern.

FLICKER-ACTIVATION

Flicker activation of ALL neurolog. condit.:	38%
" " of IDIOPATH. EPILEPSY:	62%
" " of NORMALS:	none
	some resynchroniz.)
	(yet, 40% display
UNILAT. HEMISPHERE DRIVING in focal lesions:	60%

Fig. 6. Summary on Flicker-Activation (50 subjects).

We have tabulated in Figure 6 the flicker response in 50 subjects. We tried to differentiate between "activation" meaning a gross desynchronization of EEG pattern, and "resynchronization," meaning a "following" of cortical harmonics or subharmonics corresponding to flicker frequencies. We noticed that 38 percent of all neurological disorders could be activated with photic stimulation. The highest percentage of activation (62 percent) was found to be the group of "idopathic epilepsy." Hemispheric driving in localizing EEG's was noticed in 60 percent indicating that the affected hemisphere showed resynchronization of the flicker pattern in the occipital-cortical response. It will need a much larger number of subjects to prove the validity of the presented percentages which are here given only on a preliminary basis.

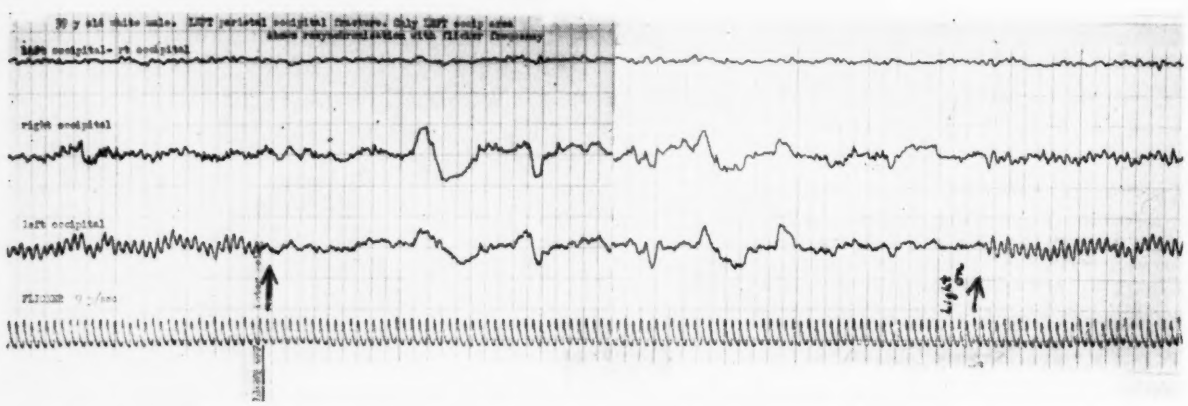

Fig. 5. "Hemisphere driving," observed in a 39 year old white male with depressed *left* parietal-occipital skull fracture. The affected left occipital area shows predominant "resynchronization." (Flicker markings on EEG produced by rotating disc.)

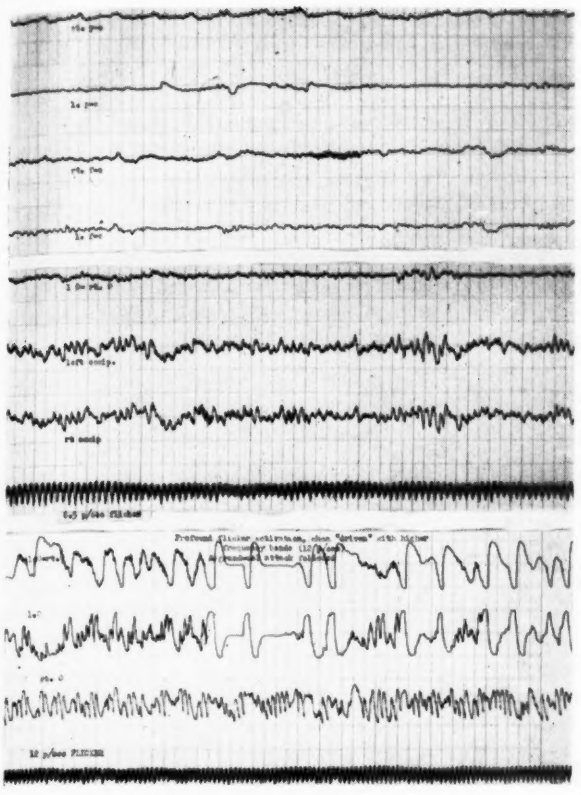

Fig. 7.

a) 31 year old male; obscure epilepsy.
b) Paroxysmal activation with 8.5 p/sec flicker.
c) Profound flicker activation when "driven" with 12 p/sec. flicker. This was followed by a grand mal attack.

The efficacy of "photic driving" in cases of epileptiform disorders is documented in Figure 7. It showed the EEG of a 31 year old male who suffered from obscure convulsive attacks which were thought at one time to be conversion reactions. Resting EEG was normal; 8.5 p/sec flicker produced fairly synchronous activation of neuronal discharges; 12 p/sec flicker produced profound "activation" followed clinically by a grand mal epileptic attack. Previous hyperventilation failed to produce any activation.

In summary, we may state that photic driving is somewhat less useful than hyperventilation for EEG activation in "idiopathic" epilepsy, but may be more valuable in focal irregularities, particularly over posterior areas. Further investigation is needed to elaborate on the problem of unilateral "hemispheric driving."

Recently, the method of combined photic and metrazol activation (Gastaut[14]) is being investigated in various laboratories. The practical usefulness of this method seems still problematic on account of insufficient number of observations.

Summary

1. The method of hyperventilation, Metrazol administration and photic stimulation are compared and their relative merits to elicit or accentuate abnormalities in the electroencephalogram ("EEG Activation") discussed.

2. The method of hyperventilation is of limited value in children below ten years and is not always of diagnostic significance in adults. It is of greatest value in adults suffering from "idiopathic" epilepsy or "dysrhythmic" migraine.

3. Metrazol activation was found to be most useful in "symptomatic" epilepsy and localizing lesions close to the cortex.

4. Photic stimulation seems less useful than hyperventilation for EEG activation in "idiopathic" epilepsy, but may prove useful in focal irregularities over the posterior areas, should the problem of "hemispheric driving" be substantiated in a larger number of subjects.

Author's Note: The assistance and technical cooperation of Edward Marsh, B.E.E., in the foregoing study is gratefully acknowledged.

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Bromide Intoxication

(A Medico-Legal Issue)

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A course of events unique in the history of American medicine has taken place in the last ten years. Psychiatrists and other physicians, testifying as experts on behalf of manufacturers of patent medicines containing bromide, in official proceedings of the United States Government, have denied that bromide is dangerous. Their action has not been in the public interest, for their testimony has contributed, or could have contributed, to the exploitation and the abuse of a drug that has driven thousands of people into mental hospitals and not a few to their graves.

Proceedings were instituted by the Federal Trade Commission on the ground that warnings printed on the labels of medicines sold over the drug counter were inadequate and it was sought to require manufacturers to revise the labels so as to give the purchaser a more adequate conception of the dangers that might follow the use of bromide. The manufacturers do not see eye to eye with the Commission in the matter of what these dangers are and how serious they are. The gravest dangers being in the psychiatric sphere, manufacturers brought forward experts, who tried to refute the common belief that bromide may produce psychoses.

The experts relied on three arguments. (1) Bromide psychoses, they said, are extremely rare, so rare as to be negligible. (2) The drug, when given experimentally, does not produce any substantial signs of intoxication, even when the serum bromide concentration attains a level of 150 milligrams per cent, a level which most physicians consider dangerous. (3) When bromide does produce a psychosis, the fault is not with the drug but with the victim's abnormal predisposition to insanity.

These claims were made with a certain color of plausibility, but I propose to show that they are fallacious and without substance.

Frequency of Bromide Psychoses

The experts for the manufacturers produced statistics to show that bromide psychoses are too rare to be of any practical importance. Figures were offered, for example, from the mental hospital system of one of our greatest states showing that over a period of many years the incidence of psychoses due to *all* drugs was only 0.2% of all first admissions.

However, these figures do not reflect the true incidence of drug psychoses. The great majority of the mental hospitals in this country and Canada are governed by statistical policies set forth in a manual sponsored by the American Psychiatric Associa-

tion.[1] This manual contains the following instruction pertaining to drug psychoses (page 29):

"Cases developing a toxic reaction from the use of drugs in the treatment of another form of psychosis should be reported according to the primary psychosis and not as drug psychoses."

This instruction, if followed, will render valueless any statistics on drug psychoses. If, for example, a man takes bromide for a psychoneurosis and is admitted to the hospital in delirium, the case will be indexed as a psychoneurosis rather than a bromide delirium. At hospital staff meetings I have often heard physicians say, "I think the patient has a bromide delirium, but, in line with what the Manual says, I think we must classify him as a psychoneurosis." A hospital might receive ten cases of bromide delirium in the course of a year, but since every patient had some pre-existing disorder for which the bromide was taken, the total at the end of the year, in the column under bromide psychosis, might read zero!

This directive is impractical in application. If it were applied in general hospitals it would lead to great confusion. For instance a patient admitted to the hospital for agranulocytic angina from amidopyrine, which he had taken for sinus headache, would be classified as sinusitis. If a woman had taken it for menstrual pain, her case would be classified as dysmenorrhea. An investigator going to these statistics to ascertain the frequency of amidopyrine toxicity would be completely misled.

Another fact, also, must be considered. The success of a mental hospital in recognizing its cases of bromide delirium will depend in part on whether a serum bromide determination is made routinely in every case on admission or soon after. There are few hospitals that do this. In some hospitals a serum bromide test is done only on request. The trouble with this is that the possibility of bromide delirium is easily overlooked, especially in a busy hospital where there may not be time to take a complete history. Even if you ask a patient's relatives if he has been taking drugs, they may mislead you and say "No," for to many laymen "drugs" means morphine, heroin, etc., and not bromide. Delirium is not recognized as often as it should be[2] and is often wrongly diagnosed as schizophrenia or some other psychosis. In many cases it is not until the patient has unexpectedly recovered that the physician starts to consider the possibility that the psychosis might have been a bromide delirium, and then it may be too late for chemical verification. For these reasons every hospital that receives acute cases should do a bromide test routinely in every case on admission. I don't mean that every patient with a high level in the serum has a bromide psychosis. Sometimes the bromide in the serum, high though it be, is of no clinical significance, as in the case of schizophrenic who has taken the drug without developing any clinical signs of intoxication superimposed on his schizophrenia. However, knowing that the serum level is high will alert the physician to the possibility of bromide psychosis.

In order that hospital statistics on bromide psychoses be of value the following conditions must be observed: the Statistical Manual should be broadly interpreted and a serum bromide determination be done routinely in every newly admitted case.

Toxicity of Bromide

When a patient comes to the hospital in a bromide intoxication, the serum bromide concentration is usually found to be above 150 milligrams per cent, a fact which has led physicians to speak of 150 as "the toxic level." It may be less than 150, for some people are hypersensitive to the drug. It may also be less if the patient has stopped taking the drug some time prior to admission, for with discontinuance of the drug the serum bromide level starts to fall.

Some experts for the manufacturers questioned this conclusion, and they attempted to prove their point by administering bromide and checking the serum level from time to time and noting the signs of intoxication, if any. Their findings led them—or rather misled them, as I shall soon point out—into disputing the prevailing medical opinion that 150 is a toxic level. They found that they could push bromide to a serum level of 150, or even higher, without provoking any substantial clinical signs of intoxication.

But owing to a serious defect, these experiments, which the experts consider decisive, are not decisive at all, and are in fact meaningless. The subjects were given so much bromide daily, until the desired serum bromide level was reached, whereupon the drug was stopped; and if the desired level was not reached after so many weeks, the drug was stopped anyway. A paper published by several of these experts, reported that a group of normal people were given bromide long enough to attain a serum level of between 120 and 200, but in no case was the drug given beyond the fourth week.

The defect in these experiments is the failure to consider that a patient's reaction to bromide depends not only on the level of serum concentration he has reached, but also on the length of time the concentration has remained at that level. A poison does harm in proportion to the length of time it has been acting. A man may get drunk with impunity, but if he remains in a steady drunk long enough he is sure to suffer. When physicians say that a serum bromide concentration of 150 is a toxic level, what they mean is that that level, *if maintained long enough,* will suffice to cause intoxication. They don't mean that people become delirious the moment their level hits 150 although that may occur too. There are, indeed, people who can tolerate a very high level, even 300, for a few days, but who become delirious only if that level is maintained long enough.

The experiments therefore are meaningless. It is well to know that you can give bromide for four weeks without producing an intoxication, but people who take this drug don't always stop at the end of four weeks.

Millikan and Paul[3] have reported a case revealing the pitfall that awaits one who fails to take into account this factor of the length of exposure. The case was of a young girl admitted to the hospital in a delirium that was thought to be due to bromide. The serum bromide level was 132. Millikan and Paul were skeptical, so when the child got well they undertook to reproduce the intoxication and see whether this would bring back the delirium. They gave the patient 60 grains of bromide a day for thirteen days, at the end of which there was no return of delirium despite the fact that the serum bromide level had reached 177. Since they had surpassed the admission level by 45 points, Millikan and Paul felt that they had more than proved that the delirium must have been due to something other than the bromide. On this point they say:

> "This case might easily have gotten into the literature as one of bromism, although the admission serum bromide level was only 132. . . . This case shows how easy it would be . . . to report 125 milligrams per cent or lower (depending on the time at which the patient was seen) as the level of bromide in the blood sufficient to cause intoxication."

But Millikan and Paul cannot be sure that they duplicated the original conditions of the case. In their case report they say that "no adequate history could be obtained." The child came into the hospital with a serum bromide level of 132, but we don't know how long she had been taking bromide and how long her serum bromide concentration had been at that level. Since no adequate history could be obtained, we must consider all the possibilities. One of them is that the serum bromide concentration had reached 132 (or higher) one month before admission, and had been maintained at that level continuously during the month. If so, you are not duplicating the original conditions when you give bromide to a level of 132 (or even 177) and then stop, for when you stop the bromide level will begin to fall; having reached the level of 132, you must maintain it for a month.

Having overlooked this possibility, Millikan and Paul cannot be sure that they duplicated the original conditions, and their exoneration of bromide as the cause of the delirium is unwarranted.

Predisposition to Psychosis

The third argument of the experts is that since they have proved (as they mistakenly think they have) that bromide is not as toxic as claimed, it follows that in bromide psychosis the villain is not the bromide but the victim's instability and predisposition to mental disease. The predisposition, they argue, has caused the victim to respond abnormally to an innocent drug.

Now no one will quarrel with the concept of predisposition, for people differ in their

sensitivity to bromide as to any other poison. But a good tool can be used to bad ends, and a concept that is valid can be used in a manner that is invalid. The manufacturers, emphasizing that not everyone is predisposed to mental disorder, have in effect taken the position: "Why penalize, by restricting the sale of bromide, the people who are not predisposed?" But this is like arguing that we ought not to restrict the sale of firecrackers, since the victims of firecracker accidents are mostly children and other people of immature judgment which makes them careless.

It is precisely the people with abnormal predisposition who, because of nervousness, are the largest consumers of bromide. The tragedies of many, who have developed bromide psychoses, might have been averted by wider appreciation of the dangers of this drug.

There has been a tendency to brush delirium aside as something of no very great importance, since it usually clears up in a short time. But, however benign it may be, delirium is not something to be taken lightly. Thousands of people are sent to mental hospitals because of bromide delirium, and though most of them recover and are discharged, the blow to their self-esteem is not easily repaired. No delirium is without its risks. I recall the case of a woman, the mother of several attractive daughters of marriageable age. In the sex life of this woman and her husband there had been a certain unpleasantness, an abnormality which they had kept a secret. In the course of a bromide delirium the woman babbled about her sex life, and revealed enough to raise some very disturbing questions in her daughters' minds.

Of all the maladies known to man, the bromide psychoses are the easiest to prevent. They would be wiped out over-night if only the dangers in the use of this drug were better known.

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Novaldin and Serum Albumin in the Treatment of Irreversible Insulin Coma

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The author has developed a regime for the treatment of protracted insulin coma and it is hoped that this form of management will be of help by bringing about a less anxiety-producing role for the therapist. So far the method has been extremely promising. Recovery from irreversible coma has been almost phenomenal in a series of some 30 cases treated.

Fear of irreversible coma frequently interferes with the proper utilization of deep insulin shock therapy. Kalinowsky and Hoch, and Diethelm emphasize that deeper coma increases the incidence of improvement. In fact it has frequently been observed that following recovery from protacted coma the patient showed a marked improvement mentally. Kalichman, Rondepierre and Oules, and Kalinowsky and Hoch have called attention to this fact. Such observations have led a few to devise certain modified methods of prolonged coma treatment, such as described by Kraulis, Billig and Sullivan, Wortis et al, and Rivers and Rome. However, because of frequent failures in the treatment of severe protracted coma, including organic syndromes and death, little utilization has been made of this phenomenon as a possible therapeutic tool.

Various methods of treatment have been suggested. Stark and Barrera advocate the use of potassium chloride. Puech et al report that 5 out of 6 protracted comas responded to trephine puncture as an emergency measure. Høyruk, and Wortis and Lambert recommended blood transfusion. Bond and Shurley have reported that i. v. sucrose or sorbitol, thiamine chloride and concentrated plasma are beneficial. Kalinowsky and Hoch review the methods of several authors and outline their own method of treatment.

The treatment outlined here was developed at the V. A. Hospital, Roanoke, Va. Since our goal in therapy was medullary coma, termination was routinely carried out by means of 200 to 300 cc of 33 percent glucose with 100 mgs. of thiamine chloride, i. v. Because of the danger of producing deeper coma for short periods of time following termination by gastric lavage, this procedure was not used. Criteria for diagnosis of protracted coma included failure of the patient to respond with signs of lightening coma after five minutes, appearance of widely dilated pupils which did not respond promptly to light, pallor or cyanosis, beginning of labored respiration, rapid pulse and usually beginning restlessness. Generally there was also failure of the patient to respond to vigorous painful stimuli. A more reliable sign was the later appearance of elevated temperature, frequently as high as 105 to 106 degrees rectally.

The importance of beginning treatment as early as diagnosis is possible is stressed. First, 2 cc of Novaldin (Winthrop-Stearns) were given i. v., followed immediately by 20 cc of normal human serum albumin (concentrated, salt-poor, 5 gms. in 20 cc.) through the same needle. As a rule, one such dose was sufficient to produce actually dramatic improvement within a short time. In cases which did not show a significant change within 15 minutes, the serum albumin was repeated. Only occasionally was the Novaldin repeated. Roughly a third of the patients required oxygen, by mask, because of profound cyanosis. Invariably the pulse rate was from 140 to 180 per minute. In those cases showing evidence of pulmonary edema or cardiac failure, rapid digitalization was carried out with full digitalizing dose of cedilanid, given i. v. Two cases with acute cardiac dilatation were benefited by bleeding, and withdrawal of 150 to 200 cc of blood appeared to be sufficient. Further hypertonic glucose was administered as indicated by return of sweating or of deepening coma. As soon as possible, usually fairly early, sucrose was administered by gastric

lavage in order to supply a constant source of carbohydrate. All heads of beds were elevated to an angle of about 45 degrees. In those patients with marked elevation of temperature, sponging with alcohol was carried out constantly until the temperature began to break. Almost invariably the acute signs had disappeared within an hour after the beginning of treatment, and it was then possible to give 1000 cc of 10 percent glucose in water i. v., not only to supply glucose but also to replenish fluids lost by sweating. If the patient had not shown pulmonary edema, the glucose was given in normal saline. If it was not felt safe to give saline at this time, a clysis of saline was given later in the evening. Most patients were able to take liquids by mouth within a few hours, the longest being eight hours after onset of symptoms. All were ambulatory by the following morning. After patients were able to take fluids by mouth, small quantities of juice and sucrose or milk and sucrose were encouraged frequently. All patients were able to make intelligible responses in from 2 to 8 hours. Remaining confusion lasted from one to ten days. A very interesting observation was the presence of hypersomnia during the period of confusion. The patients would fall asleep while sitting up and talking, even in the middle of a sentence. Shaking them or calling their name loudly would awaken them quickly. As long as they were walking about they did not fall asleep. Such hypersomnia was felt to be hypothalamic in origin, and the patients appeared in this respect very much as a patient described by Fulton and Bailey. This patient was Case II, and she had a tumor in the hypothalamic region. The development of protracted coma was not considered a contraindication to continuing treatment, after all evidence of confusion had disappeared clinically.

The use of Novaldin was suggested by Dr. Otto Billig who had been inspired by an article by Risak, wherein the author concluded after administering it in the treatment of meningitis that it increased the permeability of the meninges. Novaldin alone did not produce the dramatic results, however, and it was only when it was administered with serum albumin that the gratifying and rapid improvement followed. Serum albumin alone was not promising. Serum albumin had originally been used on the assumption that a large part of the initial symptoms at least were on the basis of cerebral edema. It is not possible at this time to determine what the action of these drugs are here. The etiology of irreversible coma remains largely obscure (Kalinowsky and Hoch). We have made a few laboratory studies of cases before and after treatment, but the results were not helpful.

Conclusions:

A method of treatment of irreversible insulin coma has been outlined. Results in our hospital where it was developed have to date been dramatic. All patients recovered and there were no residual neurological signs. It is felt that, although the etiology of irreversible coma is largely obscure and the action of the drugs in producing improvement is not known, this form of treatment warrants further trial and investigation.

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Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

CASE NO. 250890

Presentation

A 75-year-old white man was brought to the hospital by the police on April 27, 1949, after having fallen down a stairway in a bar where he had been drinking beer. He believed that he had been unconscious for several minutes but was not sure. On arrival in the Receiving Ward he was awake and alert. He had vomited once before the doctor saw him.

Physical examination revealed an alert, elderly man in no distress except for some pain in the left hip. There were abrasions about the occiput. The neurological examination was normal. Blood pressure was 165/75. Roentgen study of the skull and left hip revealed no fracture. The cerebrospinal fluid was under a pressure of 130 mm. water; the tap was adjudged traumatic, the fluid contained red cells which did not completely disappear as fluid was removed. The final pressure was 120 mm. Tetanus antitoxin was administered.

On the second hospital day the patient complained of crawling sensations extending downward from the left shoulder into the arm, forearm, and to the dorsal surface of three fingers (omitting the little finger) of the left hand. No local tenderness was found, but palpation of the neck caused pain to shoot upward into the occiput. No weakness could be detected. Hyperesthesia was found over the lateral surface of the left shoulder, arm, and forearm to a point a bit distal to the elbow joint. Deep reflexes were not altered.

Roentgen plates of the cervical spine revealed fracture dislocation at the level of C3 on C4. Crutchfield tongs were inserted into the skull on April 28 and 14 pounds of weight were added. This was increased to 18, then 20 pounds on April 29. The patient's complaints cleared quickly after this treatment, and films revealed complete reduction of the subluxation by May 5.

Besides an occasional complaint of dizziness and of pain in the head, he was comfortable and most cooperative, despite the positioning required by the traction apparatus. The complaint of dizziness became more frequent after May 9, and after some of these episodes he noted everything going black. Codeine and aspirin were sometimes required for the head pain; he had received 21 doses of codeine (either ½ or 1 grain) through May 13. His sleep was fitfull.

On the afternoon of May 13 he was slightly confused, and on May 14 he was listless and weak. On May 15 he was lethargic and involuntarily voided urine. The temperature, pulse rate, and respiration were unchanged, and a general examination revealed no abnormalities. The blood urea nitrogen was within normal limits. On May 16 he was much more lethargic and difficult to arouse and he was generally weak. Lumbar puncture on May 16 revealed an initial pressure of 240 mm. water. The fluid was slightly xanthochromic and contained no cells. The protein was 125 mg. per cent.

On May 16 exploratory burr holes in the frontal and temporal regions bilaterally revealed a large chronic subdural hematoma on the right. The hematoma of about 150 cc. was removed through the two trephine openings. When irritating through the bone openings some of the subdural membrane was flushed loose, and it was possible to remove a large portion of the subdural hematoma sac with gentle traction. Post-operatively the patient was drowsy but responsive.

Two hours after the operation, bright red drainage saturated the dressing. The pulse was weak, the skin cold with profuse perspiration and the patient less responsive. The blood pressure was 160/100. A ventricular needle was inserted through the right temporal wound into the subdural space. Approximately 30 cc. of old blood was drained in this manner, with slight improvement in the state of consciousness. Cyanosis was relieved with the use of nasal oxygen. Later that day (May 17) 15 cc. of blood were again evacuated on the right. On May 18 he moved all of his limbs spontaneously and responded to questions and took food. At this time plantar responses were extensor bilaterally. Lumbar puncture revealed a pressure of 210 mm. and clear, colorless fluid.

He gradually worsened again and on May 21 had a left Jacksonian convulsion which lasted about an hour until it was halted with parenterally administered sodium amytal. Re-exploration of the wounds with a needle did not reveal blood. A ventriculogram was attempted but the air, while filling the subdural and subarachnoid spaces, did not outline the ventricles.

By May 25 drowsiness had re-appeared and there was weakness of the left extremities. The right trephine openings were re-explored; clotted blood filled these openings. This clot was gently evacuated with forceps and irrigation and exploration through the trephines resulted in evacuation of only small bits of clot. As most of this seemed to be coming from above, the trephine was enlarged in that direction and about 30 cc. of old liquid blood was evacuated. The brain beneath was soft and contused. Insertion of a needle into the brain tissue to a depth of 3 centimeters in several directions revealed no intracerebral clot.

Post-operatively the patient showed no improvement, responding slightly when his name was called. The left extremities remained weak. He developed ulceration over the sacral region. On May 24 he vomited dark green liquid and was hiccoughing. He had frequent black, liquid stools from May 24 to 28. On May 28 a bloody discharge from the right nostril was noted. Cheyne-Stokes respiration developed on May 28.

His temperature was 103.4 on May 31 and rose to 105.4 on June 3. His pulse volume was weak after June 1, the perceptible beats numbering 68 to 74 per minute. On May 31 the respiratory rate was 38 and the respiration shallow. He died on June 3 on the 38th hospital day.

Differential Diagnosis

Dr. Daniel Osher: A 75-year-old man was first seen shortly after having fallen down some stairs. He believed that he had been briefly unconscious but on examination was found to be alert and without focal neurological signs, thus at this time there was no evidence of significant injury to the brain. Spinal puncture revealed bloody fluid under normal pressure, but the tap was thought to be traumatic. In any event the patient may or may not have had traumatic subarachnoid bleeding.

The following day he began complaining of paresthesias on the left side of the neck radiating down the left arm to the hand. Palpation of the neck caused pain to shoot into the occiput. There were no neurological signs pointing to cord injury. X-rays of the cervical spine revealed a fracture dislocation at the level of C3-4, which obviously explained the left arm symptoms. Treatment of this fracture dislocation with skeletal traction quickly relieved these symptoms.

At this point we might review the first stage of this man's injury. He had a minor head injury with no focal neurological signs or changes in the state of consciousness. However, in any head injury no matter how mild, one must always keep in mind the possibility of the future development of a subdural hematoma. This man had abrasions of the scalp in the occipital region and it is known that a blow in the sagittal plane of the skull will more likely than a lateral blow cause a tear of the superior cerebral veins as they pass into the sagittal sinus. One other point is the fact that a not infrequent concomitant of head injury is a cervical fracture. These patients must be handled with great care until the neck is ascertained to be normal.

The patient seemed to be in good condition without obvious signs of neurological deficit for a week to ten days after the injury when he began complaining of dizziness, pain in the head, and blacking out spells. He then showed progressive reduction of consciousness with confusion, listlessness, lethargy, and incontinence of urine. His vital signs remained normal. No focal signs were noted.

A lumbar puncture was done approximately 2½ weeks after the fall and elevated pressure and protein were found as well as slight xanthochromia. It became obvious that an expanding lesion had to be considered, most likely a subdural hematoma, and therefore bilateral exploratory burr holes were made and a large subdural hematoma found on the right. The liquid portion as well as a large part of the neo-membrane was removed.

Immediately post-operatively the patient did not do as well as might be expected, but this could be explained on the basis of cerebral edema following manipulation, and also to change in intracranial relationships. He did improve to a certain extent following needling of the subdural space with the additional removal of some old blood, and two days later was able to move all limbs and take food. However, he did continue to have bilateral Babinski responses and the cerebrospinal fluid pressure remained slightly elevated and the fluid clear.

Again he began to show progressive signs and symptoms with drowsiness, left-sided convulsions, and weakness. Recurrent subdural bleeding was considered and nine days after the first operation the right trephine openings were re-explored, more clot was found, evacuated, and the boney opening enlarged. The brain was seen to be contused and soft and needle exploration for subcortical clot was negative. The patient continued to get worse and left hemiparesis persisted. He developed epistaxis and tarry stools and terminally hyperpyrexia with death occurring 38 days after injury.

In an attempt to reach a diagnosis as to the cause of death in this patient, a brief review of his clinical course will be made.

At the onset there was no evidence of gross brain injury. He did develop a subdural hematoma. This apparently was evacuated, although the completeness of this evacuation was never proven. It is unfortunate that attempts at ventriculography were unsuccessful, because this might have shown a persistent expanding lesion. One seems justified in assuming in view of the two explorations and evacuations of subdural blood, that the clot had been evacuated. The patient still showed signs of a right cerebral lesion with the persistent hemiparesis. This lesion was probably not the result of a gross intracerebral hemorrhage inasmuch as the brain had been needled, although this procedure does not completely rule out clot. The brain was seen to be contused at the time of the final exploration, which must have developed in relation to the subdural hematoma and probably to the operative interference.

A condition which may tie up the cerebral lesion with the nasal hemorrhage and probably the bowel hemorrhage is thrombosis of the longitudinal sinus secondary to subdural hematoma. This condition usually occurs in marantic infants. It has been reported following head injury. Its formation may be encouraged as result of pressure from a subdural hematoma. On the other hand, such thrombosis may be envisioned as contributing to the further production of subdural bleeding by interfering with the drainage from bridging veins and encouraging their rupture. With longitudinal sinus thrombosis there occurs gradual change in the state of consciousness, unilateral or bilateral neurological signs due to extension of the thrombosis into the superior cerebral veins with secondary intracerebral venous hemorrhages. Nasal hemorrhages may occur from congestion and rupture of anastamosing veins between the intracranial venous system and the intranasal veins. The gastroenteric hemorrhage may be due to neurogenically induced ulceration of the esophagus, stomach, or duodenum.

In summary, I believe that this man had a minor cerebral concussion, fracture dislocation of the cervical spine, chronic right subdural hematoma, and finally thrombosis of the superior longitudinal sinus.

Discussion of Pathology

Dr. Murton Shaver: The necropsy was done 9 hours after death. Abnormalities without the nervous system included thrombosis of the right external iliac artery and multiple pulmonary emboli associated with acute hemorrhagic infarction. Near the pyloric area of the stomach there were several small areas of superficial abrasion measuring 5 to 6 mm. in diameter. These did not contain more than minimal amounts of blood.

The hair of the head was recently shaved. There were bifrontal and right temporal incisional wounds. There was a rather large amount of hemorrhage in the deeper layers of the scalp. Corresponding to the wounds of incision there were three calvarial defects. In the frontal areas they were approximately ¾ in. in diameter and in the right temporal area the defect was approximately 1¼ in. in diameter.

Figure 1. A photograph of the inferior surface of the dural cap to show the large, organizing subdural hemorrhage on the right.

The dural cap was preserved in situ and showed a strongly adherent greyish-brown clot measuring 12 x 7 cm. underlying the right leaf and depressing the posterior

frontal and parietal lobes to a depth of approximately 1 to 1.5 cm. (Figure 1). This clot was adherent to the underlying arachnoid. The adjacent areas of the right cerebrum showed depressions with yellowish discoloration and some softening over the right frontal lobe. There was herniation of the mesial face of the right frontal lobe beneath the falx measuring approximately 5 cm. The left cerebral hemisphere showed nothing abnormal besides some thickening of the leptomeninges with congestion of veins and widening of sulci. The convolutions on the left were not flattened. The tissue throughout was well-preserved. The vessels at the base showed no sclerotic change and appeared to be of normal distribution.

The cerebrum and brain stem were sectioned coronally at 1 cm. intervals. (Figure 2.) These sections revealed shifting of the midline structures from right to left, most obvious in the posterior frontal region where the septum pellucidum was shifted 9 mm. to the left. There had occurred herniation of the mesial portion of the right hemisphere beneath the falx. The anterior portion of the right lateral ventricle was displaced downward and toward the left. The corpus callosum was depressed on the right; the tip of the anterior horn of the right lateral ventricle was approximately one-half the size of that on the left side. A few small circumscribed areas of hemorrhage measuring as much as 4 mm. in diameter were found in the centrum semiovale of the right side, in the posterior frontal region underlying the area of compressed cortex caused by the subdural hematoma. A few smaller punctate hemorrhages were found in the cortex immediately anterior to this. The third ventricle was compressed throughout.

Sections through the cerebellum and the brain stem revealed congested vessels in the medial portion of the pons and scattered in the medulla.

Microscopic sections made through the border of the subdural hematoma including the dura and subdural membrane were stained with hematoxylin and eosin and phosphotungstic acid and demonstrated scattered areas of hemorrhage throughout the dura with a few small aggregations of red blood cells in the extradural tissues at the operative site. Underlying the dura was a thick layer of blood clot which showed a few endothelial cells infiltrating from the inner surface of the dura, together with some fibroblasts, which gave the outer portion of the clot a slightly laminated appearance. There was a thick inner membrane composed of large numbers of endothelial cells which, in some places, showed budding capillaries extending deeply into the blood clot. In some areas of the membrane there were large numbers of fibroblasts. At some points the membrane was thin, but it still showed characteristic layers of endothelial cells with invasion into the clot.

Numerous sections of spinal cord from upper and lower cervical, thoracic, and lumbar, and regions stained with hematoxylin and eosin, cresyl-violet, and phosphotungstic acid failed to demonstrate any distinct pathological changes. A few of the vessels in the posterior columns appeared to be hyalinized, but no degeneration could be seen either in the white matter or gray columns. The nerve cells in the anterior columns appeared well preserved.

Clinical Diagnosis

Subdural hemorrhage, right, evacuated.
Cerebral contusion, right.
Fracture dislocation of spine, C-3 on C-4.

Dr. Osher's Diagnosis

Subdural hematoma, right, chronic.
Fracture dislocation of spine, C-3 on C-4.
Thrombosis of the superior longitudinal sinus.

Anatomical Diagnosis

Organizing, recurrent subdural hemorrhage, right, with secondary softening and atrophy by compression of right frontoparietal area.

Intracerebral hemorrhage, small and multiple, right frontal.

Cerebral laceration, right temporal.

Multiple pulmonary emboli originating from thrombosis of right external iliac artery.

Multiple small erosions of the mucosa of the stomach.

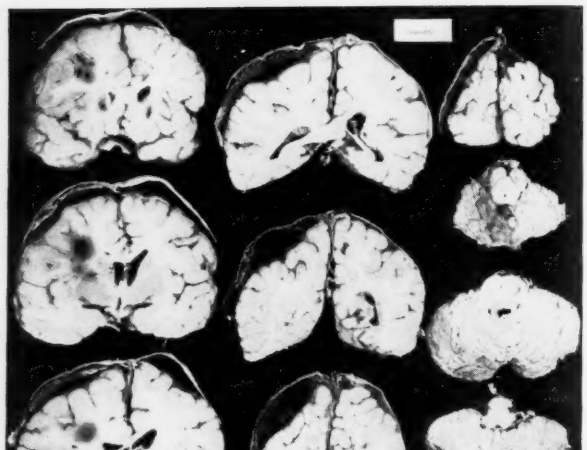

Figure 2. A photograph of sample coronal sections of the brain, 1 cm. in thickness (see text for description).

Dr. Milton Rosenbaum: There is no question about the subdural hematoma which was not evacuated, but it is interesting that a needle inserted into the brain resulted in the impression that the brain was soft and contused. Considering the clinical history, I agree that one would have the feeling that he had not suffered a severe head injury. If he had, he would not have been able to stand the spinal traction and remain in good physical health. I would think that later something happened to his brain. He was 75 years old, and drawing on other cases we have seen, we might wonder whether he suffered from generalized cerebral edema and traumatic petechial hemorrhage, as is so often the case in old people.

Dr. Osher: Was the sagittal sinus explored?

Dr. Shaver: Yes, it was normal.

Student: Why couldn't air be injected into the ventricles?

Dr. Jos. P. Evans: I do not remember clearly why we could not get filling of the ventricles. This lesion would have been discovered had the ventriculogram been successful. I think the important lesson to be learned here is that wherever possible we should obtain an autopsy, even though they are sometimes humiliating.

Dr. Osher: At the risk of sounding stubborn, I would like to say that one of the causes of recurrent subdural bleeding is sagittal sinus thrombosis. I assumed that the subdural hematoma had been removed because it had been evacuated twice, apparently this was not good judgment. Blood might have oozed after the evacuation. In the photographs of the brain there was the external appearance suggesting venous thrombosis. I would like to ask if the surface of the left side of the brain looked normal?

Dr. Shaver: Yes, though we felt it unnecessary to do microscopic studies.

Dr. Aring: It is obvious that the physicians who saw this man on the ward missed the opportunity to save him. I think the most important point to be learned by this experience is that when a patient does not recover after the evacuation of a subdural hematoma, we ought to make it our business to find out why.

Student: I read somewhere that the removal of the source of increased intracranial pressure sometimes results in brain swelling. Does it ever continue over a two-week period?

Dr. Osher: No, it usually remits in two or three days.

Student: What is the incidence of secondary hemorrhage in an injured brain?

Dr. Shaver: We have seen one case where there was hemorrhage into the softened area, but it is, I believe, extremely rare.

Dr. Aring: Late apoplexy is very rare indeed in my experience; however, secondary hemorrhage into the brain stem is common and a usual mode of death in expanding intracranial lesions. Another important condition also overlooked in this patient was the concomitant spinal injury. F. M. R. Walshe has called attention to cervical spinal lesion in association with head injury. Frequently the obtrusive signs of the latter overshadow the less pressing but just as important signs of spinal injury.

Clinical Observation of Use of Sodium Pentothal In Heterogeneous Cases

(A Follow-up Study)

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In a preliminary study in November, 1949, the author[1] reported a series of heterogeneous cases in which the use of sodium pentothal narcosynthesis proved to be of some value. The preliminary report emphasized the fact that it is difficult to scientifically evaluate heterogeneous material with any statistical significance; but, further investigation has made the value of narcosynthesis in these varied psychiatric conditions appear more valuable. In this follow-up study we are reporting 125 pentothal interviews on 40 individuals, including cases discussed in the preliminary report. These cases have all been followed for six to thirty-six months with favorable results.

We shall itemize the number of interviews received by the patients in each category, as well as a presentation of brief case histories which best demonstrate the value of narcosynthesis in each category.

PRE-HOSPITAL AND OFFICE ..... 22 cases
- Schizophrenia 14
  - Ambulatory 3
    - 2—2 interviews
    - 1—4 interviews
  - Hospital 11
    - 2—1 interview
    - 1—2 interviews
    - 5—3 interviews
    - 3—5 interviews
- Depression 8
  - Hospital 5
    - 1—1 interview
    - 1—2 interviews
    - 2—3 interviews
    - 1—4 interviews
  - No Hospital 3
    - 1—2 interviews
    - 1—3 interviews
    - 1—6 interviews

POST HOSPITAL ..... 5 cases
- Schizophrenia 2
  - 1—3 interviews
  - 1—4 interviews
- Depression 3
  - 2—2 interviews
  - 1—5 interviews

CHILD PSYCHIATRY ..... 1 case
- 1—1 interview

ALCOHOLISM ..... 7 cases
- 3—2 interviews
- 1—4 interviews
- 1—5 interviews
- 1—6 interviews
- 1—7 interviews

STUTTERING ..... 1 case
- 1—2 interviews

NEURO-DERMATITIS ..... 1 case
- 1—3 interviews

DRUG ADDICTION WITH ANXIETY ..... 1 case
- 1—2 interviews

PSYCHOPATHIC PERSONALITY ..... 1 case
- 1—2 interviews

COMPULSIVE-OBSESSIVE NEUROSIS ..... 1 case
- 1—5 interviews

In relation to the psychoses, we have previously discussed the fact that sodium pentothal narcosynthesis cannot serve as the only therapy. However, we feel there is an application in certain instances of psychoses where narcosynthesis may prove to be a valuable adjunct. First, in the cases where the differential diagnosis is between a neurosis and psychoses, and the symptomatology is rather muddled on conscious questioning, the sodium pentothal interview helps to give a clear, distinct picture of the patient's mental content. Second, following shock therapy in the hospital for an acute psychosis, many patients return to their pattern of living still retaining an underlying tendency toward a neurotic pattern or some anxiety, and in these cases post-hospital use of narcosynthesis is extremely helpful. Also, narcosynthesis has been employed to evaluate the degree of deterioration in psychoses, remission in psychoses, as well as prognosis of treatment. Several papers[2-8] have been written expressing the various aspects of the use of sodium pentothal and related barbiturates in relation to the psychoses.

One typical example of each category of the psychotic conditions listed in the chart

under the headings of "Pre-hospital" and "Post-hospital" now follows in the sequence of listing.

CASE NO. 1: J.J., a 25 year old white, single female was first seen on June 25, 1947. She expressed hallucinations which showed a tendency to escape from reality. Even though a great part of her clinical picture appeared normal, a thorough evaluation of her personality led to a diagnosis of ambulatory schizophrenia with insight. Two pentothal interviews revealed that the patient's impending marriage had precipitated long standing fears on a sexual basis. By eliciting the basis for the attempt to escape from reality, and with conscious interpretation, the patient responded sufficiently well to readjust herself successfully and not require any further therapy.

CASE NO. 2: G.P., a 29 year old, white, married male was first seen on March 8, 1949, in a state of complete panic. On original examination the patient appeared to have a marked anxiety state with an abnormal degree of excessive introspection of his personal well being. However, under a sodium pentothal interview the patient became quite hallucinatory and his degree of concern reached psychotic proportions of a schizophrenic level. The patient was subjected to a course of electric and insulin shock therapy to which he responded exceedingly well.

CASE NO. 3: M.W., a 35 year old, white, divorced female was first seen on October 18, 1947, with a complaint of an inability to sleep. Any attempt to elicit any degree of depression was consistently minimized by the patient. However, three sodium pentothal interviews revealed the true depth of a severe depression, ultimately borne out in the future by a suicidal attempt necessitating hospitalization.

CASE NO. 4: L.M., a 19 year old, married, white female was first seen on September 4, 1946. She presented a clinical picture of an acute depression. However, three sodium pentothal interviews showed sufficient evidence of a marital disturbance to give the patient sufficient insight into her own problems to clear up her depressive state.

CASE NO. 5: H.S., a 27 year old, white, married female was first seen in consultation on July 15, 1947. Her diagnosis was an early schizophrenia. She was subjected to a course of electric and insulin shock treatment to which she responded very favorably. Upon her return to her previous pattern of activities, she appeared at the office in a mild anxiety state. Three pentothal interviews were required to reaffirm her confidence in herself in relation to society; since her period of hospitalization had caused her psychological distress and a loss of security in her everyday activities.

CASE NO. 6: L.G., a 27 year old, white, married female was first seen on November 17, 1947, with a clinical picture of an acute depression. The patient was subjected to a course of electric shock with good results. However, shortly following treatment, the patient demonstrated a marked anxiety state. The patient was subjected to two sodium pentothal interviews, and thus narcosynthesis was superimposed upon shock therapy successfully.

Favorable responses have been reported by foreign authors[9-11] using sodium pentothal narcosynthesis in child psychiatry. A case report successfully employing the pentothal interview in children from the author's own experience follows:

CASE NO. 7: R.E., an 11 year old white boy was brought into the office on October 25, 1947, with a chief complaint of enuresis. The child had been examined by numerous pediatricians and organic pathology had been ruled out. No apparent etiology could be demonstrated on conscious questioning. Under a pentothal interview the boy revealed that he had a strong resentment towards his father, due to the fact that the father's occupation necessitated his arriving home late; and upon his arrival, the boy felt that the father distracted the mother's complete attention away from him. Thus, the enuresis served as a mechanism to attract the attention of the mother. When this phenomenon was interpreted to the mother and recommendation made to her to avoid creating this situation, the condition improved.

There seems to be definite value in the use of sodium pentothal narcosynthesis in alcoholism. Favorable results of other authors[12-13] have been verified in this series and further studies are anticipated. A characteristic report follows:

CASE NO. 8: N.S., a 26 year old, white, married male was first seen on September 1, 1947, with an extensive history of alcoholism. Several acute episodes were relieved with paraldehyde and bed rest. Finally, two sodium pentothal interviews were performed revealed a very marked feeling of insecurity coupled with a tremendous drive for success and security, obviously frustrated. The proper encouragement and the appearance of a new opportunity, added to the new insight the patient had developed, was the combination of factors that proved successful.

The final cases presented, although of no statistical significance, are of academic interest and merit further investigation.

A case of stuttering revealed a definite degree of improvement directly related to the degree of relaxation.

CASE NO. 9: A.G., a 45 year, white, married male was first seen on April 23, 1947, with a request for improvement for a long standing condition of stut-

tering. Two sodium pentothal interviews ascertained two outstanding features. First, and above all, the stuttering per se was minimized to almost nil during the optimal phase of the interview. Second, under narcosynthesis, it was subjectively volunteered by the patient that situations that were pleasant over a period of time would cause definite improvement in his speech, and unpleasant situations would cause the stuttering to be increased.

Likewise in the case of neuro-dermatitis some vague improvement resulted with relaxation.

CASE NO. 10: E.B., a 35 year old, white, married female was first seen on March 1, 1947, with an extremely resistive case of neuro-dermatitis. The exact value of narcosynthesis in this instance can only be expressed in relative terms, since subjectively the patient would under no circumstances ever admit an improvement of her basic condition. However, the patient exhibited a better understanding of herself and of her household problems which in turn gave rise to some definite relaxation and less irritation of her skin lesions.

A case involving drug addiction with anxiety is interesting academically in that it stresses the fact that the clinical picture in any person may have two independent psychiatric conditions superimposed upon each other.

CASE NO. 11: N.G., a 29 year old, white, single female was seen first at home on March 1, 1947. She had developed a tremendous fear of leaving home and gave a clinical impression of an anxiety state. Two sodium pentothal interviews revealed that the patient had become a drug addict, and the anxiety state was a superimposed condition. The anxiety state was greatly improved with this therapy, but because of the usual pattern of lack of cooperation of drug addicts, the case was not followed beyond a six month period.

In a case of a psychopathic personality, even though it was not anticipated to reach a level of insight, it was interesting to observe the value of a change in program with an ultimately successful result, actually giving the clinical appearance of insight.

CASE NO. 12: L.G., a 31 year old, white, single male was first seen in consultation on June 1, 1946. He gave the clinical impression of a psychopathic personality whose value and attitude to society was a very problematical one. His problem of masturbation was excessively abnormal as well as exceedingly depressing to the patient. Since the patient had an inexhaustible source of wealth at his disposal, his schedule was extremely informal and without any semblance of constructive purposes or regularity. At no time during his lifetime had he been able to accomplish any achievements. Two sodium pentothal interviews revealed a marked insecurity of the patient, with extreme remorse concerning his failure to achieve. The setting up of a new program in which achievements could be accomplished at the level of the limited intelligence which the patient demonstrated, seemed to be sufficiently ego fulfilling to bring a successful conclusion to the problem by eliminating the excess time previously devoted to masturbation.

Usually, compulsive obsessive neuroses constitute therapeutic problems. Korson[14] reports the successful treatment of a compulsive obsessive neurosis employing narcosynthesis followed by daily electric shock. We are presenting a case report of a compulsive obsessive neurosis that demonstrated a good response with sodium pentothal narcosynthesis.

CASE NO. 13: V.A.K., a 29 year old, white, married female was first seen on June 6, 1948. She presented a typical compulsive obsessive neurosis. With the aid of five sodium pentothal interviews, she has obtained a great amount of insight into her personality make-up and into some of the potential factors that constitute the basis of her neurosis. Her response has been very good, although deep seated neuroses of this type require long periods of understanding and psychotherapy.

The foregoing heterogeneous cases have been presented in which the use of sodium pentothal narcosynthesis has proved to be of definite value. It is suggested that further observations and studies in these channels are warranted.

Summary and Conclusions:

1) We have presented a follow-up study of the use of sodium pentothal narcosynthesis in a series of heterogeneous cases.

2) Case histories have been presented demonstrating the value of this technique in individual application.

3) Definite value of narcosynthesis has been ascertained in these heterogeneous cases.

4) Further observations and studies of the use of narcosynthesis in heterogeneous cases are warranted.

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Book Review

The Normal Cerebral Angiogram. By ARTHUR ECKER, M.D., PH.D. 182 pages. Charles C. Thomas, Publisher. Springfield, Illinois, 1951.

Dr. Ecker has presented us with the first American monograph on cerebral angiography. His efforts have been most painstaking in making this volume complete in every detail. The book is divided into technique and interpretation. The publisher's efforts in reproducing the angiograms leave little to the reader's imagination. The chapters on procedure and complications are of value for those with limited experience. The complicating factor of variability of the diodrast preparation is not sufficiently stressed. The reader gains the impression that cerebral angiography is a most benign procedure. This is certainly not true.

The largest and by far the most worthwhile portion of the monograph is devoted to normal angiographic interpretation. Each artery and vein seen in the angiogram is discussed with its anatomy. The submental and optic foramen views presented seem to demonstrate the carotid artery more clearly than the standard views used by most neurosurgeons.

The discussion on vascular relations to the tentorial notch and foramen magnum as determined by angiography is unique. He is able to distinguish both upward and downward displacement of the brain stem in cases of expanding intracranial lesions. Because of such observations he now performs cerebral angiography in brain tumor suspects before carrying out a lumbar puncture of air study. This seems to show more enthusiasm over cerebral angiography than wisdom would indicate. The bibliography is not as complete as one would wish.

This book is most welcome for the neurologist, whether he be surgical, medical, or radiological, and one hopes that the author and publisher will be able to follow up with the abnormal angiogram.

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